

Claims

1. A method for controlling power in a wireless communication system having multiple reverse-link communication channels, the method comprising:
adjusting power levels of a first set of channels and a corresponding pilot channel; and
adjusting traffic-to-pilot (T/P) ratios for one or more remaining channels independently of the power level of the pilot channel.
2. The method as recited in claim 1, further comprising maintaining ratios of the power levels of the first set of channels and the pilot channel while adjusting the power levels of the first set of channels and the pilot channel.
3. The method as recited in claim 1, wherein the first set of channels comprises a single channel, wherein adjusting the power levels of the first set of channels and the corresponding pilot channel comprises determining whether data received on the single channel contains errors and, if the data received on the single channel contains errors, incrementing the power levels of the single channel and the corresponding pilot channel and, if the data received on the single channel does not contain errors, decrementing the power levels of the single channel and the corresponding pilot channel.
4. The method as recited in claim 3, wherein determining whether the data received on the single channel contains errors is performed by a base station, wherein the method further comprises the base station sending a message to a mobile station to increment or decrement the power levels of the single channel and the corresponding pilot channel.
5. The method as recited in claim 4, wherein incrementing the power levels of the single channel and the corresponding pilot channel is performed by the mobile station in response to the message.

6. The method as recited in claim 3, wherein the single channel comprises a voice channel.

7. The method as recited in claim 1, wherein the first set of channels comprises multiple channels, wherein adjusting the power levels of the first set of channels and the corresponding pilot channel comprises determining for each channel in the first set whether data received on the single channel contains errors and determining a composite adjustment of the power levels of the first set of channels and the corresponding pilot channel based on errors received on the multiple channels.

8. The method as recited in claim 7, wherein determining the composite adjustment of the power levels of the first set of channels and the corresponding pilot channel comprises:

for each channel in the first set,

determining whether data received on the channel contains errors,

if the data received on the channel contains errors, determining a corresponding incremental power level adjustment, and

if the data received on the single channel does not contain errors, determining a corresponding decremental power level adjustment; and

computing the composite adjustment as a function of the incremental and decremental power level adjustments for the channels in the first set.

9. The method as recited in claim 8, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the maximum incremental power level adjustment and all of the decremental power level adjustments.

10. The method as recited in claim 8, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the maximum incremental power level adjustment to the minimum decremental power level adjustment.

11. The method as recited in claim 8, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the minimum incremental power level adjustment to the maximum decremental power level adjustment.

12. The method as recited in claim 8, wherein the function of the incremental and decremental power level adjustments is constrained to a limited number of quantized levels.

13. The method as recited in claim 1, wherein adjusting the T/P ratios for each of the one or more remaining channels comprises determining whether data received on the channel contains errors and, if the data received on the channel contains errors, incrementing the T/P ratio for the channel and, if the data received on the channel does not contain errors, decrementing the T/P ratio for the channel.

14. The method as recited in claim 13, wherein determining whether the data received on the channel contains errors and incrementing or decrementing the T/P ratio for the channel is performed by a base station, wherein the method further comprises the base station sending a message to a mobile station indicating the T/P ratio for the channel.

15. The method as recited in claim 14, further comprising the mobile station receiving the message and selecting transmission characteristics for the channel in accordance with the T/P ratio for the channel.

16. A system for controlling power in a wireless communication system having multiple reverse-link communication channels, comprising:

a base station; and

a mobile station coupled to the base station via a wireless communication link;

wherein the base station is configured to receive data from the mobile station on a plurality of reverse-link channels on the wireless communication link; and

wherein the base station is configured to adjust a power level for a first set of reverse-link channels and a power level for a pilot channel, and to adjust a traffic-to-power (T/P) ratio for each of one or more additional reverse-link channels.

17. The system as recited in claim 16, wherein the base station is configured to adjust the power levels for the first set of reverse-link channels and the pilot channel to maintain ratios of the power levels for the first set of reverse-link channels to the power level of the pilot channel.

18. The system as recited in claim 16, wherein the first set of channels comprises a single channel and wherein the base station is configured to determine whether data received on the single reverse-link channel contains errors and, if the data received on the single reverse-link channel contains errors, to cause the power levels of the single reverse-link channel and the pilot channel to be incremented and, if the data received on the single reverse-link channel does not contain errors, to cause the power levels of the single reverse-link channel and the pilot channel to be decremented.

19. The system as recited in claim 18, wherein the base station is configured to cause the power levels of the single reverse-link channel and the pilot channel to be incremented or decremented by sending corresponding messages to the mobile station.

20. The system as recited in claim 19, wherein the mobile station is configured to increment or decrement the power levels of the single reverse-link channel and the pilot channel in accordance with the messages.

21. The system as recited in claim 16, wherein the first set of channels comprises multiple channels, wherein the system is configured to adjust the power levels of the first set of channels and the corresponding pilot channel by

determining for each channel in the first set whether data received on the single channel contains errors and determining a composite adjustment of the power levels of the first set of channels and the corresponding pilot channel based on errors received on the multiple channels.

22. The method as recited in claim 21, wherein the system is configured to determine the composite adjustment of the power levels of the first set of channels and the corresponding pilot channel by:

for each channel in the first set,

determining whether data received on the channel contains errors,

if the data received on the channel contains errors, determining a corresponding incremental power level adjustment, and

if the data received on the single channel does not contain errors, determining a corresponding decremental power level adjustment; and

computing the composite adjustment as a function of the incremental and decremental power level adjustments for the channels in the first set.

23. The system as recited in claim 22, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the maximum incremental power level adjustment and all of the decremental power level adjustments.

24. The system as recited in claim 22, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the maximum incremental power level adjustment to the minimum decremental power level adjustment.

25. The system as recited in claim 22, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the minimum incremental power level adjustment to the maximum decremental power level adjustment.

26. The system as recited in claim 22, wherein the function of the incremental and decremental power level adjustments is constrained to a limited number of quantized levels.

27. The system as recited in claim 16, wherein the base station is configured to determine whether data received on each additional reverse-link channel contains errors and, if the data received on the additional reverse-link channel contains errors, incrementing the T/P ratio of the additional reverse-link channel and, if the data received on the additional reverse-link channel does not contain errors, decrementing the T/P ratio of the additional reverse-link channel.

28. The system as recited in claim 27, wherein the base station is configured to send messages indicating the incremented or decremented T/P ratio of the additional reverse-link channel to the mobile station.

29. The system as recited in claim 28, wherein the mobile station is configured to set a power level of the additional reverse-link channel in accordance with the messages.

30. A base station operable to communicate with a mobile station via a wireless communication channel, wherein the base station comprises:

- a processing subsystem; and

- a transceiver subsystem coupled to the processing subsystem;

- wherein the transceiver subsystem is configured to receive signals on a first set of reverse-link channels, a pilot channel and one or more additional reverse-link channels; and

- wherein the base station is configured to adjust power levels for the first set of reverse-link channels and a power level for the pilot channel, and to adjust a traffic-to-power (T/P) ratio for each of the one or more additional reverse-link channels.

31. The base station as recited in claim 30, wherein the first set of reverse-link channels comprises a single reverse-link channel, wherein the base station is configured to adjust the power levels for the single reverse-link channel and

the pilot channel to maintain a ratio of the power level for the single reverse-link channel to the power level of the pilot channel.

32. The base station as recited in claim 30, wherein the base station is configured to determine whether data received on the single reverse-link channel contains errors and, if the data received on the single reverse-link channel contains errors, to cause the power levels of the single reverse-link channel and the pilot channel to be incremented and, if the data received on the single reverse-link channel does not contain errors, to cause the power levels of the single reverse-link channel and the pilot channel to be decremented.

33. The base station as recited in claim 30, wherein the base station is configured to cause the power levels of the single reverse-link channel and the pilot channel to be incremented or decremented by sending corresponding messages to a mobile station which is configured to increment or decrement the power levels of the single reverse-link channel and the pilot channel in accordance with the messages.

34. The base station as recited in claim 30, wherein the first set of channels comprises multiple channels, wherein the base station is configured to adjust the power levels of the first set of channels and the corresponding pilot channel by determining for each channel in the first set whether data received on the single channel contains errors and determining a composite adjustment of the power levels of the first set of channels and the corresponding pilot channel based on errors received on the multiple channels.

35. The base station as recited in claim 34, wherein the base station is configured to determine the composite adjustment of the power levels of the first set of channels and the corresponding pilot channel by:

for each channel in the first set,

determining whether data received on the channel contains errors,

if the data received on the channel contains errors, determining a

corresponding incremental power level adjustment, and

if the data received on the single channel does not contain errors,
determining a corresponding decremental power level
adjustment; and
computing the composite adjustment as a function of the incremental and
decremental power level adjustments for the channels in the first
set.

36. The base station as recited in claim 35, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the maximum incremental power level adjustment and all of the decremental power level adjustments.

37. The base station as recited in claim 35, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the maximum incremental power level adjustment to the minimum decremental power level adjustment.

39. The base station as recited in claim 35, wherein the function of the incremental and decremental power level adjustments for the channels in the first set comprises adding the minimum incremental power level adjustment to the maximum decremental power level adjustment.

39. The base station as recited in claim 35, wherein the function of the incremental and decremental power level adjustments is constrained to a limited number of quantized levels.

40. The base station as recited in claim 30, wherein the base station is configured to determine whether data received on each additional reverse-link channel contains errors and, if the data received on the additional reverse-link channel contains errors, incrementing the T/P ratio of the additional reverse-link channel and, if the data received on the additional reverse-link channel does not contain errors, decrementing the T/P ratio of the additional reverse-link channel.

41. The base station as recited in claim 30, wherein the base station is configured to send messages indicating the incremented or decremented T/P ratio of the additional reverse-link channel to a mobile station which is configured to set a power level of the additional reverse-link channel in accordance with the messages.